Deacon's Challenge No. 14 Answer

A 0.5 mL sample of urine is extracted into dichloromethane. An aliquot of the extract is analysed by HPLC and found to give an apparent original concentration of 320 nmol/L of analyte Y. 100 µL of Y standard with a concentration of 880 nmol/L is added to a further 0.5 mL sample of the same urine and the sample mixed. 0.5 mL of the mixed sample is then processed as before, giving a measured concentration of 405 nm/L. Calculate the recovery of analyte Y.

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Please note that there was a "typo" in the question as published in the March ACB News – only 100 µl of Y standard was used not 100 mL!!

$$\text{Recovery (\%)} = \frac{\text{Standard recovered}}{\text{Standard added}} \times 100$$

Standard recovered = Conc Y in mixed sample - Conc of Y in urine component of mixed sample

The initial measured conc of Y in the urine was 320 nmol/L, 0.5 mL of which was diluted to 0.6 mL by the addition of 0.1 mL of standard – i.e. diluted by a factor of 6/5.

Concentration of Y in mixed sample which was derived from urine $= \frac{320 \times 5}{6} = 267$ nmol/L

Since the measured concentration of Y in the mixed sample is 405 nmol/L then the standard recovered

= Measured conc of Y in mixed sample - conc of Y from urine component

= 405 - 267 = 138 nmol/L

0.1 mL of 880 nmol/L standard was mixed with 0.5mL of urine i.e. diluted by 6

Therefore concentration of standard added $= \frac{880}{6} = 147$ nmol/L

Therefore recovery $= \frac{138 \times 100}{147} = 94\%$

Question No. 15

1 A patient was mistakenly given 500 mL 20% mannitol ($C_6H_{14}O_6$) intended for the patient in the next bed, instead of the same volume of normal (0.9%) saline. Calculate the extra osmolal load given over that which would have resulted from isotonic saline.

2 A patient known to have diabetes insipidus is admitted in coma. His plasma osmolality is 324 mosm/Kg. If his weight is 85 kg, estimate his body water deficit.

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